

**SCIENTIFIC AND TECHNOLOGICAL PRODUCTION OF THE FEDERAL
UNIVERSITY OF RIO GRANDE DO SUL: ANALYSIS OF A DECADE**

**PRODUÇÃO CIENTÍFICA E TECNOLÓGICA DAS UNIVERSIDADES FEDERAIS DO
RIO GRANDE DO SUL: ANÁLISE DE UMA DÉCADA**

Angela Pellegrin Ansuji¹; Angela Isabel dos Santos Dullius¹; Maria Emilia Camargo²; Ademar Galelli²;
Mariane Camargo Priesnitz³; Ana Eleonora Paixão³; Jonas Pedro Fabris³; Suzana Leitão Russo³

¹ Universidade Federal de Santa Maria-RS

angelaansuj@yahoo.com; angeladullius@gmail.com

² Programa de Pós-Graduação em Administração da Universidade de Caxias do Sul.

kamargo@terra.com.br, agalelli@ucs.br

³ Programa de Pós-Graduação em Ciência da Propriedade Intelectual- PPGPI

Universidade Federal de Sergipe – UFS – São Cristóvão/SE – Brasil

dra.mariane@gmail.com; aepaixao@gmail.com; jpfabris@gmail.com; suzana.ufs@hotmail.com

Abstract

Universities are centers of references in education in countries being important agents in the production of scientific and technological knowledge. In this sense, the present study examined the role of the Federal universities of the State of Rio Grande do Sul in these two areas: scientific and technological production. Technological production was analyzed by means of data obtained through the base of the National Institute of Industrial property (INPI) of 2005 by the year 2015, where patents were deposited by each institution. Scientific production was measured with the number of publications of each institution registered in Scopus in the same period. After performing this search specific bases, made a comparison between the results found. There was only the UFRGS no significant difference between the number of patents and the number of scientific production among the six federal universities that are located in the State of Rio Grande do Sul. These data report the importance of a greater incentive and investment on the part of universities, public bodies and partners with private companies in the area of technological development.

Key-words: innovation, universities, patents, scientific publications.

Resumo

As universidades são centros de referências em educação nos países, sendo agentes importantes na produção de conhecimento científico e tecnológico. Nesse sentido, o presente trabalho analisou a atuação das Universidades Federais do Estado do Rio Grande do Sul nessas duas áreas: produção científica e tecnológica. A produção tecnológica foi analisada através de dados obtidos através da base do Instituto Nacional da Propriedade Industrial (INPI) de 2005 até o ano de 2015, onde se

observaram as patentes depositadas por cada Instituição. A produção científica foi mensurada com o número de publicações de cada Instituição registrada na Scopus no mesmo período. Após a realização dessa busca nas bases específicas, fez-se uma comparação entre os resultados encontrados. Observou-se somente a UFRGS não obteve diferença significativa entre o número de depósitos de patentes e o número de depósitos de produção científica entre as seis Universidades Federais que se localizam no Estado do Rio Grande do Sul. Esses dados relatam a importância de um maior incentivo e investimento por parte das Universidades, órgãos públicos e de criação de parcerias com as Empresas privadas na área de desenvolvimento científico e tecnológico.

Palavras-chave: inovação, universidades, patentes, publicações científicas.

1. Introduction

The development of a country is closely related to its potential for technological development. Universities, in turn, are responsible for the training of specialized people and for generating scientific and technological knowledge (LASTRES, LBAGLI, 1999; CHIARINI, VIEIRA, 2012). So, nowadays universities have come to be seen as important agents in the development of a country's innovation (CHAVES, 2009).

In this sense, the National Policy of Brazilian Innovation seeking a greater incentive for economic and social development, approved the Law of Innovation - Law number 10.973, 2004. A Law that modifies aims to modify the vision of the researches and knowledge generated by the Universities emphasizing its economic importance (MUELLER, PERUCCHI, 2014). Thus, the Innovation Law "establishes measures to encourage innovation and scientific and technological research in the productive environment, aiming at training and attaining the technological autonomy and industrial development of the Country" (BRASIL, 2004).

This new paradigm in the Brazilian Innovation Systems, leads the need for a modification in the vision of the Universities, and of the active researchers. Since even today the Universities have a greater incentive in the scientific production, often leaving to be generated and disseminated the technological knowledge. According to Berti et al. (2010), The Brazilian scientific production has increased significantly in the last years, and 90% of the scientific articles came from Federal Institutions. In addition, he reported the importance of disseminating the results of research conducted in educational institutions, since from the publications new knowledge can be generated.

Felipe (2007) emphasized that the increase in scientific production is due to the existence of incentives in this area, as can be seen through training of qualified personnel, both nationally and internationally. And that the Brazilian graduate programs responsible for the training of about 10 thousand doctors per year raised the Brazilian scientific contribution worldwide.

Stumpf et al. (2012) reported the importance of scientific production for the development of policies and for the management of resources at the national and regional levels, and in its study

there was an increase in the scientific production of the southern region of Brazil between 2007 and 2009.

In relation to technological production, one of the ways of quantifying and disseminating this production is from the patents deposited (MUELLER, PERUCCHI, 2014). From the analysis of the deposited patents it is possible to have the knowledge of the development of new technologies, identifying the technological trends (INPI, 2015, p. 1), thus being an important method of prospective studies in the area of innovation (TEIXEIRA, 2013).

It is also noted that the creation of a Technological Innovation Center (NIT) can make technology transfer possible between universities and companies, allowing technological production to be encouraged, and this integration of the University with the community contributes to cultural development , Technological and social (SILVA et al., 2015).

According to Cortés (2011), about 70% of registered patents are available in patent databases. Considering that the scientific and technological production are fundamental for the construction of knowledge and information (DE MOURA, CAREGNATO, 2010), his research sought to identify the differentials between these two types of production. For this purpose, it used the database of patent deposit applications made available by the Brazilian National Institute of Intellectual Property (INPI), for the analysis of the technological production and the SCOPUS database for the evaluation of the scientific production of the Federal Universities of Rio Grande do Sul.

2. Methodology

The data collection of the present study was based on two databases. For the verification of the scientific production of the Federal Universities of Rio Grande do Sul, through the SCOPUS database, where the scientific publications of each of the 6 universities were searched. And for the verification of the technological production, a search for the patent deposits was made, at the base of the National Institute of Industrial Property of Brazil (INPI). For this the name of each one of the universities was used like descriptor in the field of the depositor.

The name of the Institutions was standardized to be used as descriptors in the two bases used. After the data were tabulated, a descriptive analysis of the results was performed and Pearson correlation was verified between the number of deposits and the number of indexed productions at the Scopus base. The difference between the means of the number of deposits and the number of productions among the institutions was carried out using the t test. The level of significance was 5%.

3. Results

In search of deposits of patents by the Federal University of Rio Grande do Sul, at the base of the National Institute of Industrial property of Brazil (INPI), 464 patent deposits were found registered between 2005 and 2015: The Federal University of Santa Maria (UFSM) with registers, the Federal University of Rio Grande do Sul (UFRGS) with 265; the Federal University of Pelotas (UFPEL) with 89; the Federal University of Health Sciences of Porto Alegre (UFCSPA) with 5; the Federal University of Pampa (UNIPAMPA) with 5 and the Federal University of Rio Grande (FURG) with 19 patent deposits.

The Federal University of Santa Maria (UFSM) showed an average of deposits in 7.46 patents, with a standard deviation of 5.25, while the average scientific output was 98.09, with standard deviation of 151.37. It can be observed that there is no correlation between the number of deposits and production number ($r = 0.60$; $p \leq 0.05$). It was observed that there was an increase of 98% in the number of deposits in the last 10 years. The Federal University of Rio Grande do Sul (UFRGS) had an average of 24.09 patent deposits, with a standard deviation of 12.36, while the average scientific output was 34.36, with standard deviation of 42.90. The increase in the number of patents in the last 10 years was 98%.

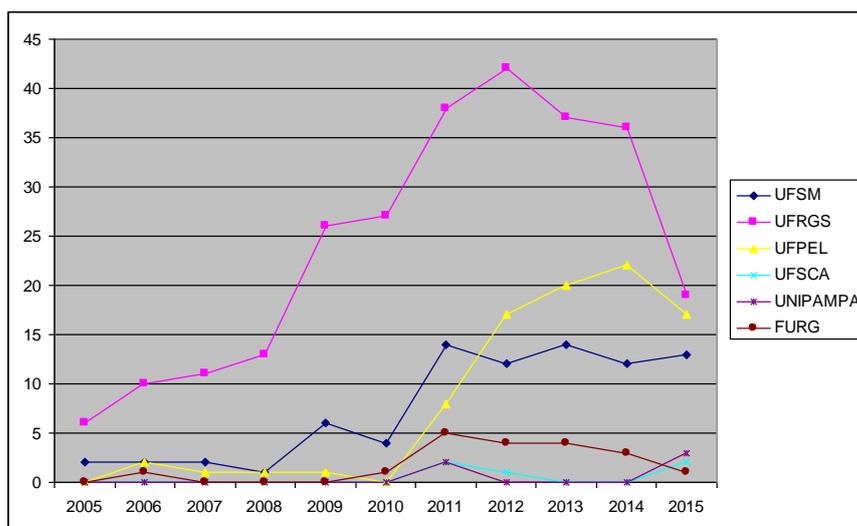
The Federal University Federal de Pelotas (UFPEL) showed an average of 8.09 patent deposits, with a standard deviation of 8.60, while intellectual production average was 4.45, with standard deviation of 2.97. The Federal University of Health Sciences of Porto Alegre (UFSCA) had patent deposits of 0.45, with a standard deviation of 0.78, while the average of scientific production was 0.27, with a standard deviation of 0.45.

The University of the Pampa (UNIPAMPA) had a mean average patent deposit of 0.45, with a standard deviation of 0.98, while the average of the scientific production was 0.90, with a standard deviation of 1.31.

The Federal University of Rio Grande do Sul (FURG) had an average patent deposit of 1.72, with a standard deviation of 1.90, while the average of scientific production was 33.18, with a standard deviation of 38.94.

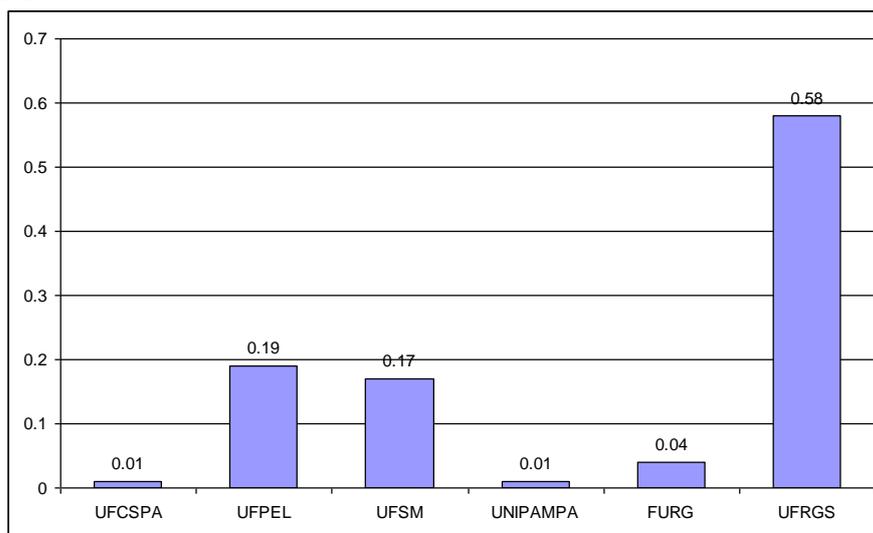
Figure 1 shows the number of applications for patent deposits and publications by the Federal Universities of Rio Grande do Sul, from 2005 to 2015. It has been verified that, in the last decade, UFRGS is the one that Number of deposits (265) followed by UFPEL (89), UFSM (82), FURG (19), UFCSPA (5) and UNIPAMPA (5), also observed in figure 2, which presents the percentages of institutions in relation to the number of patents deposited.

Figure 1- Number of applications for patent deposits and publications by the Federal Universities of Rio Grande do Sul in the years 2005 to 2015



Font: Graph constructed by the authors with INPI data

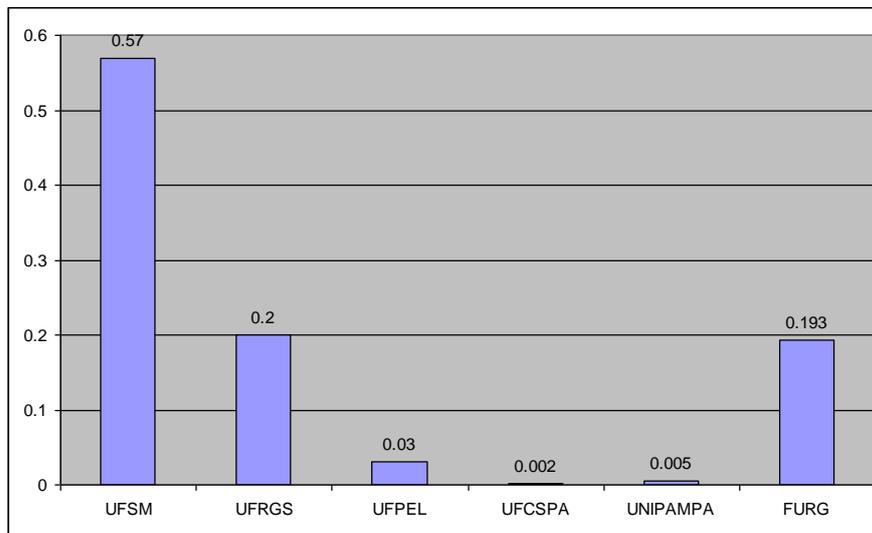
Figure 2- Percentage of the number of patents deposited by the Federal Universities of Rio Grande do Sul from 2005 to 2015.



Font: Graph constructed by the authors with INPI data

In most of the Institutions, except for UFRGS ($p = 0.69$), the number of publications deposits is significantly higher than the number of patent deposits, as shown in Figure 3.

Figure 3- Percentage of the number of publications deposited by the Federal Universities of Rio Grande do Sul from 2005 to 2015



Font: Graph constructed by the authors with INPI data

4. Conclusion

It is concluded that only UFSM had a positive and significant correlation with the increase in the number of patent deposits and publications deposits in the Scopus database, but that the number of publications repositories still far exceeds the number of Patents. The UFRGS, in the analyzed period, surpassed other universities in relation to the number of patent deposits, but on average in the last decade, the number of patents deposited and the number of publications deposited in Scopus, by the same, are equivalent. It is worth mentioning that UNIPAMPA is a relatively new institution, so there have not been as many deposits in patents and publications as the UFCSPA is a charitable institution. In this context it is verified that we still have potential to be developed so that the scientific and technological production is stimulated and developed by the Federal Universities of Rio Grande do Sul.

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References

BRASIL. Lei nº 10.973, de 2 de Dezembro de 2004. Dispõe sobre incentivos à inovação e à pesquisa científica e tecnológica no ambiente produtivo e dá outras providências. Diário Oficial da União, 3 de dezembro de 2004, p. 2. Disponível em: <<http://www2.camara.gov.br/legin/fed/lei/2004/lei-10973-2-dezembro-2004-534975-publicacaooriginal-21531-pl.html>>.

Acesso em: 10 abril 2016.

BERTI, L. C., OLIVEIRA, D. L. D., SOUZA, D. O. G. D., WOFCHUK, S. T. (2010). Produção científica e formação de recursos humanos na área de bioquímica em instituições federais do Rio Grande do Sul: fomento estadual. *Química nova*. São Paulo. Vol. 33, n. 3 (2010), 765-771.

CHAVES, D. C. R. *A universidade empreendedora do séc. XXI: o papel estratégico da propriedade industrial*. 2009. 135f. Dissertação (Mestrado em Sociologia) - Faculdade de Economia da Universidade de Coimbra, 2009.

CHIARINI, Tulio; VIEIRA, Karina Pereira. Universidades como produtoras de conhecimento para o desenvolvimento econômico: sistema superior de ensino e as políticas de CT&I. **Revista Brasileira de Economia**, v. 66, n. 1, p. 117-132, 2012.

de Moura, A. M. M., & Caregnato, S. E. (2010). Co-classificação entre artigos e patentes: um estudo da interação entre c&t na biotecnologia brasileira. **Informação & Sociedade**, 20(2)

FELIPE, Maria Sueli Soares. Desenvolvimento tecnológico e inovação no Brasil: desafios na área de biotecnologia. **Novos Estudos-CEBRAP**, n. 78, p. 11-14, 2007.

INPI - Instituto Nacional da Propriedade Industrial. Busca de patentes. Disponível em: <http://www.inpi.gov.br/menu-servicos/informacao/busca-de-patentes>. Acesso em: 20 de agosto de 2016.

LASTRES, H.M.M.; ALBAGLI, S. (Org.). *Informação e globalização na era do conhecimento*. Rio de Janeiro: Campus, 1999.

MUELLER, Suzana Pinheiro Machado; PERUCCHI, Valmira. Universidades e a produção de patentes: tópicos de interesse para o estudioso da informação tecnológica. *Perspectivas em Ciência da Informação*, Belo Horizonte, v. 19, n. 2, 2014.

Silva, L. C. S., Kovaleski, J. L., Gaia, S., Segundo, G. S. A., & Ten Caten, C. S. (2015). Processo de transferência de tecnologia em universidades públicas brasileiras por intermédio dos núcleos de inovação tecnológica. *Interciencia*, 40(10), 664.

Stumpf, I. R. C., Caregnato, S. E., de Moura, A. M. M., Vanz, S. A. D. S., & Vargas, R. D. A. (2012). Science in South Brazil: Production overview between 2000 and 2010. *Collnet Journal of Scientometrics and Information Management*, 6(1), 119-130

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